Industrial hygiene news report

ISSN 0537 5223

Reporting on new methodology and research in the recognition, evaluation and control of workplace hazards. Subscription rate: $27/year. Published by Flournoy & Associates, 1845 W. Morse, Chicago, IL 60626.

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Volume 24 September, 1981 Number 9

ACOUSTIC TRANSIENT SUPPRESSOR FOR ROTARY PNEUMATIC TOOLS

A significant reduction in noise from one of the major noise sources in the metal-working industry has been achieved through the realization of the basic mechanism of the source. H. A. Scarton of the Rensselaer Polytechnic Institute (R. P. I.) Laboratory for Noise Control Research (Troy, NY 12181) discussed the transient run-down noise of a horizontal grinder powered by a sliding-vane pneumatic motor and how it was reduced.

> Speaking at NOISE-CON 81 held at North Carolina State University at Raleigh, June 8-10, Mr. Scarton explained that the transient run-down noise is caused when the air supply to the rapidly-rotating pneumatic motor is suddenly interrupted causing a braking effect on the shaft. The energy source thus ceases to be the air supply and becomes the rotational kinetic ($1/2\ I\omega^2$) of the rapidly rotating shaft. Once one realizes that no useful work is being performed during this time when the air is being sucked back into the tool as the tool decelerates, then it becomes clear that a simple check valve should prevent all such fluid motion from occurring and lower the sound level.

To evaluate results, the steady-state free-running and transient rundown signals were obtained using a Bruel and Kjaer Type 2209 Sound Level Meter at a distance of 24 inches from the source for a Dotco horizontal grinder when equipped with original factory-supplied mufflers, and the same grinder when equipped with the R. P. I. Transient Suppressor. The meter attenuator settings were set at 110 dB for both measurements. A 15 dB drop in transient noise level to 92.5 dB was recorded for the R. P. I. Transient Suppressor as compared with the Dotco original version. The dramatic reductions of noise levels in both free-running and transient-rundown states for the R. P. I. Transient Suppressor version over the Dotco version which has no such device require only a modest increase in the diameter of the muffler housing sufficient to accommodate the worker's gloved hand.

NEW PASSIVE DOSIMETER FOR MONITORING PERSONNEL EXPOSURE TO PNA VAPORS

A new device for the collection and detection of multi-ring PNA compounds in the vapor phase has been developed at the Oak Ridge National Laboratory (Oak Ridge, TN 37830). The device is a passive dosimeter able to determine time-weighted average concentration using the principle of molecular diffusion. The PNA pollutants are adsorbed onto a filter paper treated with a heavy-atom salt. After exposure the filter paper is inserted into a spectrometer and the levels of PNA determined directly without requiring extraction. The detection method uses the room temperature phosphorescence technique. The limits of detection for several PNA compounds such as phenanthrene, pyrene, and quinoline are in the part-per-billion range for concentration in air. A description of the device was given by T. Vo-Dinh at the American Chemical Society meeting in New York City, Aug. 23-28.

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NEW METHOD FOR DETERMINATION OF FORMALDEHYDE IN AIR

A new sampling and analytical method for determination of formaldehyde in air was described by Eugene R. Kennedy of the National Institute for Occupational Safety and Health (4676 Columbia Parkway, Cincinnati, OH 45226) at the American Chemical Society's national meeting in New York City, Aug. 23-28.

Formaldehyde in air reacted with N-benzylethanolamine(BEA)-coated Chromosorb 102 sorbent to produce a derivative of formaldehyde, 3-benzyloxazolidine. Sorbent-tube samples were desorbed with isooctane and this derivative determined by capillary gas chromatography using the splitless injection technique. Analysis was accomplished using a 25-meter Carbowax 20M fused silica capillary column. Separation of this oxazolidine of formaldehyde from other low-molecular-weight aldehyde oxazolidine derivatives was possible. The range of the method was from 0.55-2.88 mg/m^3. By utilizing the split injection technique, the range was extended to at least 4.71 mg/m^3. Samples were collected at a rate of 50 cm^3/min for four hours. This volume translated to 6.6-56.5 µg of formaldehyde per sample for the range of the method. Overall relative standard deviation for the sampling and analytical method was 9.1 percent.

POTENTIAL HEALTH HAZARDS OF VIDEO DISPLAY TERMINALS INVESTIGATED

Based on low levels of radiation emitted by video display terminals examined in an investigation of three workplace sites, the National Institute for Occupational Safety and Health has determined that routine radiation surveys of VDTs are not warranted. The investigation was undertaken at the request of three unions in California where numerous complaints had been received from employees using VDTs in information processing applications. The operators reported a wide range of symptoms including headaches, general malaise, eye strain and other visual and musculoskeletal problems.

Three companies in the San Francisco Bay area participated in the survey which was conducted in four phases: (1) radiation measurements; (2) industrial hygiene sampling; (3) a survey of health complaints and psychological mood state, and (4) ergonomics and human factors measurements. Measurements of ionizing and nonionizing radiations were made on a random sample of 25 percent of the VDTs. Samples of workroom air were obtained and analyzed to determine exposure to selected airborne chemical contaminants. Health complaints and psychological mood state in VDT operators and a comparison group of non-operators were evaluated using a multifaceted questionnaire. The ergonomics and human factors evaluation was conducted by examining several workplace and VDT characteristics.

The radiation surveys demonstrated that exposure to x-ray, radio-frequency, ultraviolet, and visible radiation was well below current occupational exposure standards, and, in many cases, below the detection capability of the survey instruments. The air samples showed that there were no hazardous chemical exposures. Specifically, workplace ambient levels of carbon monoxide, formaldehyde, hydrocarbons, acetic acid and ozone were all well below current occupational exposure limits. The questionnaire survey indicated that a higher percentage of VDT operators reported more visual complaints at two of the sites, more muscular complaints at one site, and more emotional complaints at all three sites. The ergonomic evaluation of the VDT workstations indicated that measured illumination levels were generally acceptable; however, glare was a problem at a number of workstations. Some problems were noted with the physical dimensions of the workstations, including excessive keyboard height and VDT screen height.

Details of the investigation are contained in the newly released NIOSH report number 81-129. Single copies may be obtained by sending a self-addressed label to NIOSH, Publications Dissemination, 4676 Columbia Parkway, Cincinnati, OH 45226.

A SAMPLING DEVICE FOR SKIN-CONTAMINATION EVALUATION

A method has been developed by which a representative sample of contaminants on the skin of workers in coal-liquifaction plants may be collected and analyzed at extremely low levels regardless of the hazardous substance in question. The following technique was described at the American Industrial Hygiene Association meeting in Portland, Ore., in May by R. R. Keenan and S. B. Cole of Gulf Science and Technology (P.O.Box 1166, Pittsburgh, PA 15230.

In this procedure, approximately 10 ml cyclohexane is sprayed onto a limited area of the skin (5 cm^2) to be evaluated. Samples are collected by affixing a 12-ml vial to the sampling cup, holding the cup against the surface of the skin to be sampled and spraying cyclohexane through the cup onto the skin. The washings automatically drain into the sample vial. Sampling is terminated when the level of the cyclohexane in the vial reaches th sampling cup drip tube (approximately 10 seconds). The vial is removed, sealed with a Teflon-lined screw cap and returned to the laboratory for analysis. The cup is cleaned between samples by rinsing with a small amount of cyclohexane.

Prior to analysis, the samples are equilibrated to room temperature and the volume of each sample is determined by comparison with a calibrated vial. Colored samples are diluted before analysis. The samples are then transferred to 10-mm ultraviolet fluorescence cells and analyzed on an Aminco Model SPF-500 Ratio Spectrophotofluorometer by excitation at 293 nm. The presence or absence of fluorescence quenching is checked by viewing the sample cell in its holder with the excitation shutter open and the emission shutter closed. If excessive fluorescence is observed, the sample is diluted. The fluorescence emission spectra are recorded from 300 to 550 nm at a scan rate of 600 nm/min. Quantitation is accomplished by comparing the fluorescence intensity of the sample to that of the heavy distillate calibration curve. If the maximum fluorescence of the sample does not coincide with 355 nm, but falls within the 330- to 375-nm range, the fluorescence intensity at the wavelength of maximum fluorescence is determined, recorded and compared to the calibration curve previously generated.

Approximately 75 samples per day can be analyzed with this procedure. The limit of detection is 0.2 µg (0.04 µg/cm^2). Preliminary studies have exhibited recoveries of greater than 95 percent. While this sampling technique has been used solely for the collection of coal-derived materials for analysis by ultraviolet fluorescence, its application can be extended to include other contaminants as long as suitable analytical procedures reasonably free of interferences are available.

USE OF VIBRATION DAMPING IN NOISE CONTROL

Vibration damping is a practical and effective noise control measure for all types of products, especially where resonances exist, according to Robert N. Baker of Blachford Engineers (1441 E. Maple Rd., Troy, MI 48084). Speaking at NOISE-CON 81 held June 8-10 at North Carolina State University at Raleigh, Mr. Baker cited the following case histories.

In one instance, a large vibratory parts feed device (which are common sources of noise in many plants) was used to provide washers to a thread roller. The parts left the feed device, entered an indexing wheel mechanism and were assembled on the screw blank.

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The thread roller then formed the thread, capturing the washer on the screw. Noise of the feed device was a result of forced vibration of the large sheet metal surfaces as they were repeatedly struck by the washers. The inside surfaces of the feed devices were covered with an epoxy-based resilient lining which reduced the peak accelerations as the washers fell against the surface, and which also provided vibration damping to the steel. Noise was reduced 9 to 10 dB(A).

A small electrical slip ring assembly produced an objectionable high frequency sound variously described as "squeaking," or "hissing." The slip ring assembly was basically comprised of two dish-like plastic components known as the stator and the rotor, respectively. In the rotor were mounted five cantilever spring-type brushes. These made electrical contact with five stator-mounted slip rings to allow relative motion between rotor and stator. Small irregularities in the slip ring surfaces caused variations in frictional forces on the contact tips or "buttons" at the end of the cantilever spring brushes. Any of a number of the vibrational modes of the spring could be excited as a result. The lowest frequency of these was at about 1000 Hz. A metallic foil-faced vibration damping tape with a pressure sensitive adhesive was applied to the brushes and the face of the rotor (which was excited to vibration by the vibration of the brushes). This treatment reduced noise from the assembly by 5 dB(A).

A significant portion of the noise heard by the operator of a large U.S. Army forklift truck was due to the forced vibration of a number of sheet metal surfaces. Resonances were not a particular problem in this case. After feasible vibration isolation treatments had been employed, those surfaces which still contributed significantly to operator ear position noise level were treated with an extensional dampling treatment. Thickness was typically about 3 mm for the damping material. Panel thickness was typically about 1.6 mm. The average reduction in the acceleration levels in the panels was 13 dB and occurred at those frequencies where the noise levels at the operator's ear were highest.

HEALTH STATUS OF WORKERS WITH LONG TERM EXPOSURE TO PCBs

To evaluate the health effects from occupational exposure to polychlorinated biphenyls, a clinical survey was conducted of 326 workers employed in a capacitor and transformer manufacturing facility where PCBs had been used since the 1940s. At the American Chemical Society's national meeting in New York City, Aug. 23-28, Alf Fischbein of the Mount Sinai Medical Center (New York, NY 10029) gave the following summary of the study and findings:

Aroclor 1016 and, to a minor degree Aroclor 1221, had replaced the higher chlorinated PCBs two years prior to this study. Forty percent of the workers, half of whom were females, had been employed for 20 years or longer. Mean plasma concentrations of higher (Aroclor 1254) and lower (Aroclor 1242) congeners of PCBs were 124 ppb and 48 ppb respectively. Despite high plasma concentrations of PCBs, which correlated well with intensity of exposure, there was a paucity of clinical and laboratory abnormalities. However, there was a high prevalence of abnormal dermatological findings, including chloracne (6 percent) and conjunctival and palpebral abnormalities (16 percent). Association was found between dermatological abnormalities and plasma levels of higher congeners of PCBs. A similar relationship was demonstrated between higher congeners of PCBs and serum triglyceride levels. No evidence of porphyria or peripheral nerve dysfunction was found in a subgroup of this population. These findings give credence to the hypothesis that clinical effects ascribed to PCBs, may, in part, reflect a higher disease-inducing potential of contaminants, such as dibenzofurans.

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